Life Cycle Modeling Integrator (LCMI)

(Your Decision Support Toolkit)

Studies & Analysis Department

LOGCOM

16 Aug 2005

Background

- **July 2004**
  - **HQMC I&L CG testimony to Congress "We will have a total life cycle management assessment tool by Sep 04…"**
- **Sep 2004**
  - **Initial capability, web-based prototype completed (Phase I)**
- **Aug 2005**
  - **Way Ahead for LCMI?**

Decision Maker's Paradigm

- Decision Support Tools help answer the three fundamental questions facing decision makers

1. **How do I know when I have a problem?**
   Appropriate/Adequate Metrics

2. **What's causing the problem?**
   Root Cause Analysis

3. **What options or COA's exist that will solve my problem?**
   Estimating / Forecasting impact of feasible solutions…choosing optimal course of action

LCMI Design Paradigm

- **Integrated Decision Support Tools Needed At:**
  - **Tactical**
  - **Operational**
  - **Strategic**
    - **Program**
    - **Enterprise**
- **Tools Must Be Flexible**
- **One Watch**
  - **Arguing over who's spreadsheet is correct wastes time**
- **Tools compliment not replace**
  - **Policy, Processes, Systems and People**

A Growing Decision Support Capability

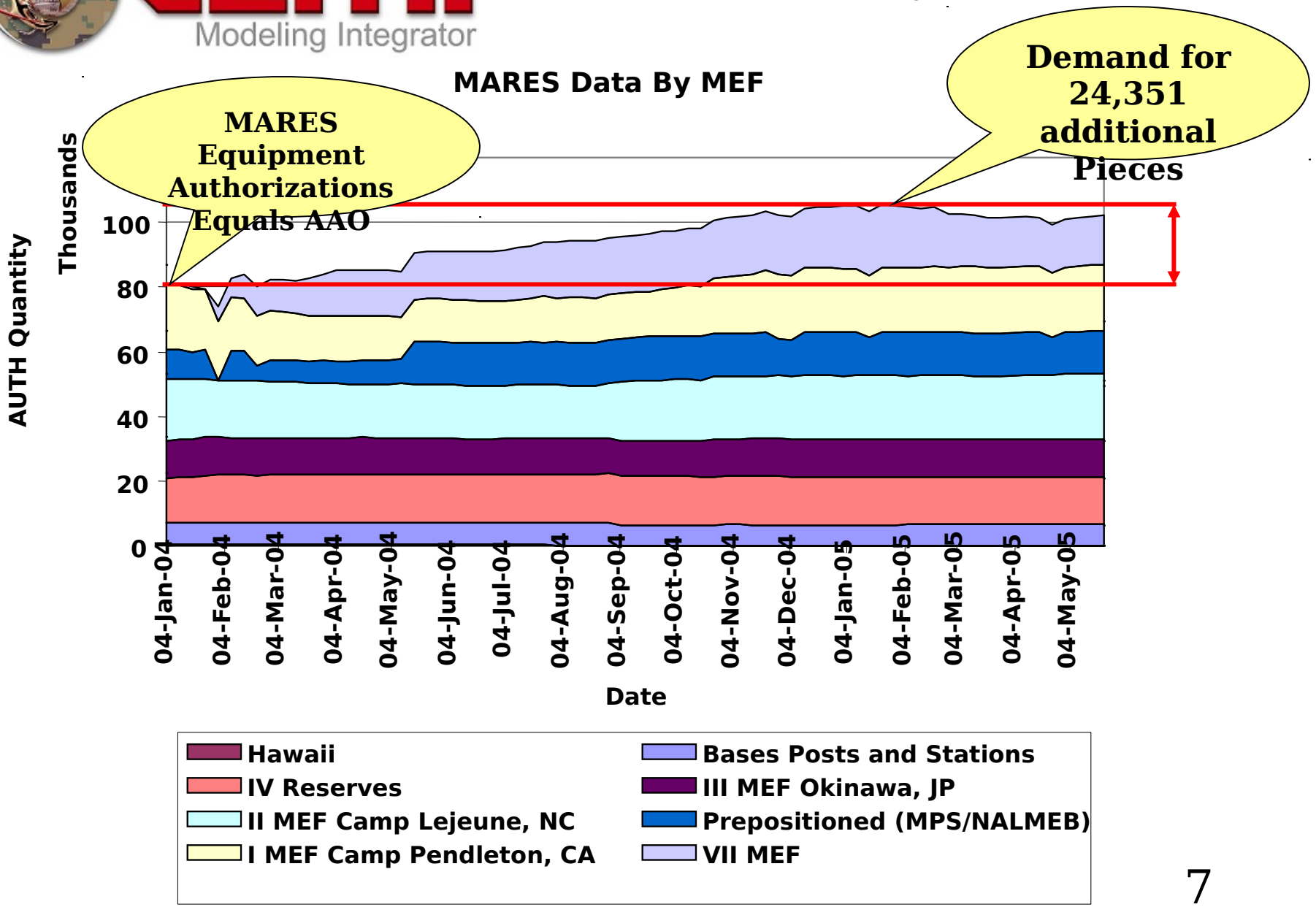
- **LCMI Provides Capability To Support Decision Maker's Paradigm:**
  - **Appropriate / Adequate Metrics**
    - **MERIT**
    - **Critical TAMCN Model**
  - **Root Cause Analysis**
    - **Total Support Cost Model**
    - **Fault Isolation Model**
  - **Estimating Impact, Exploring Implications Of COAs**

A Real World Example Of Decision Maker's Paradigm

- **There Is An Asset Shortage Problem**
  - **How do we know there are not enough assets?**
  - **What is causing the problem?**
  - **What is the best way we can solve the problem?**

Growing Demand for Equipment

Asset Availability Impacts Readiness



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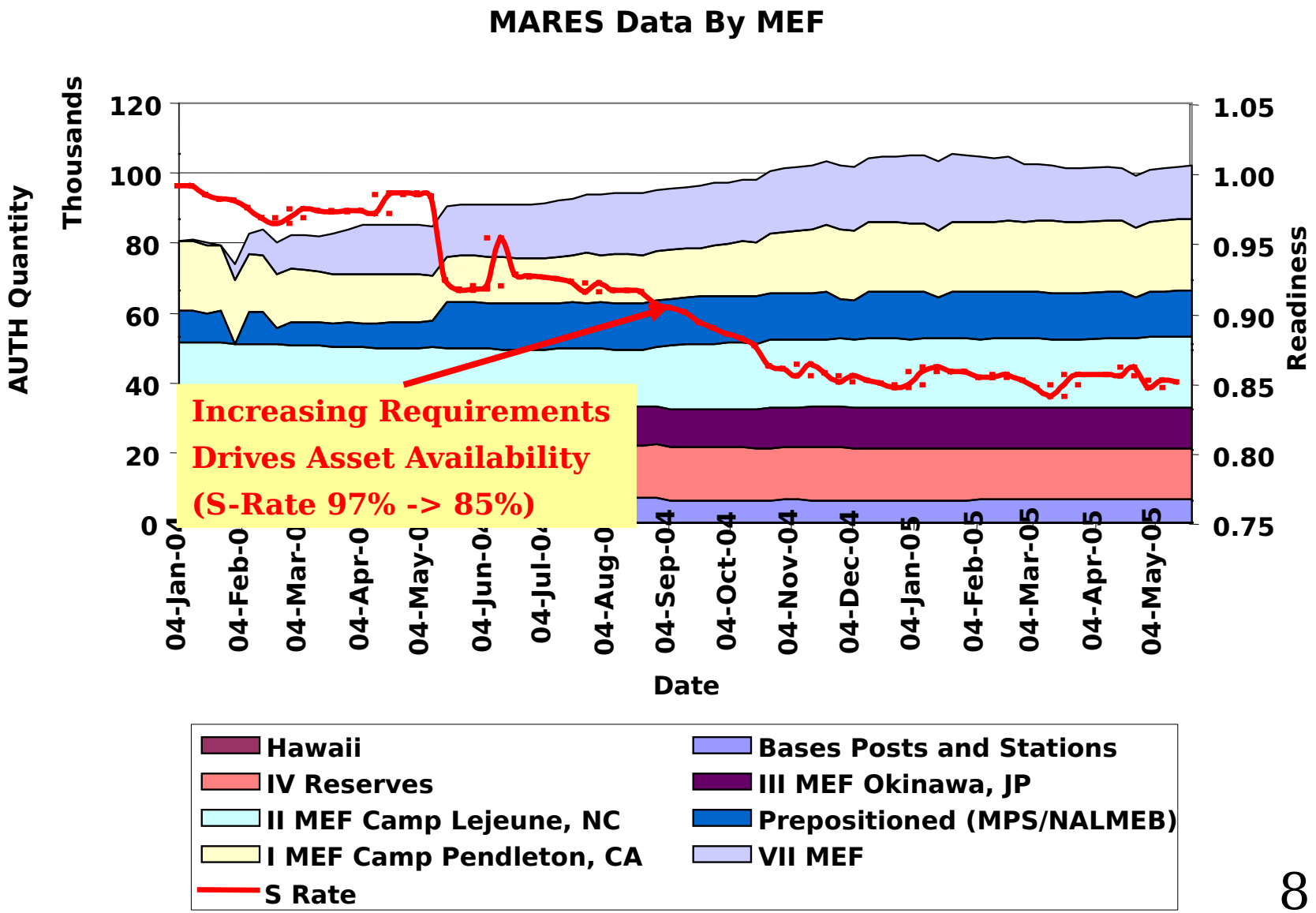
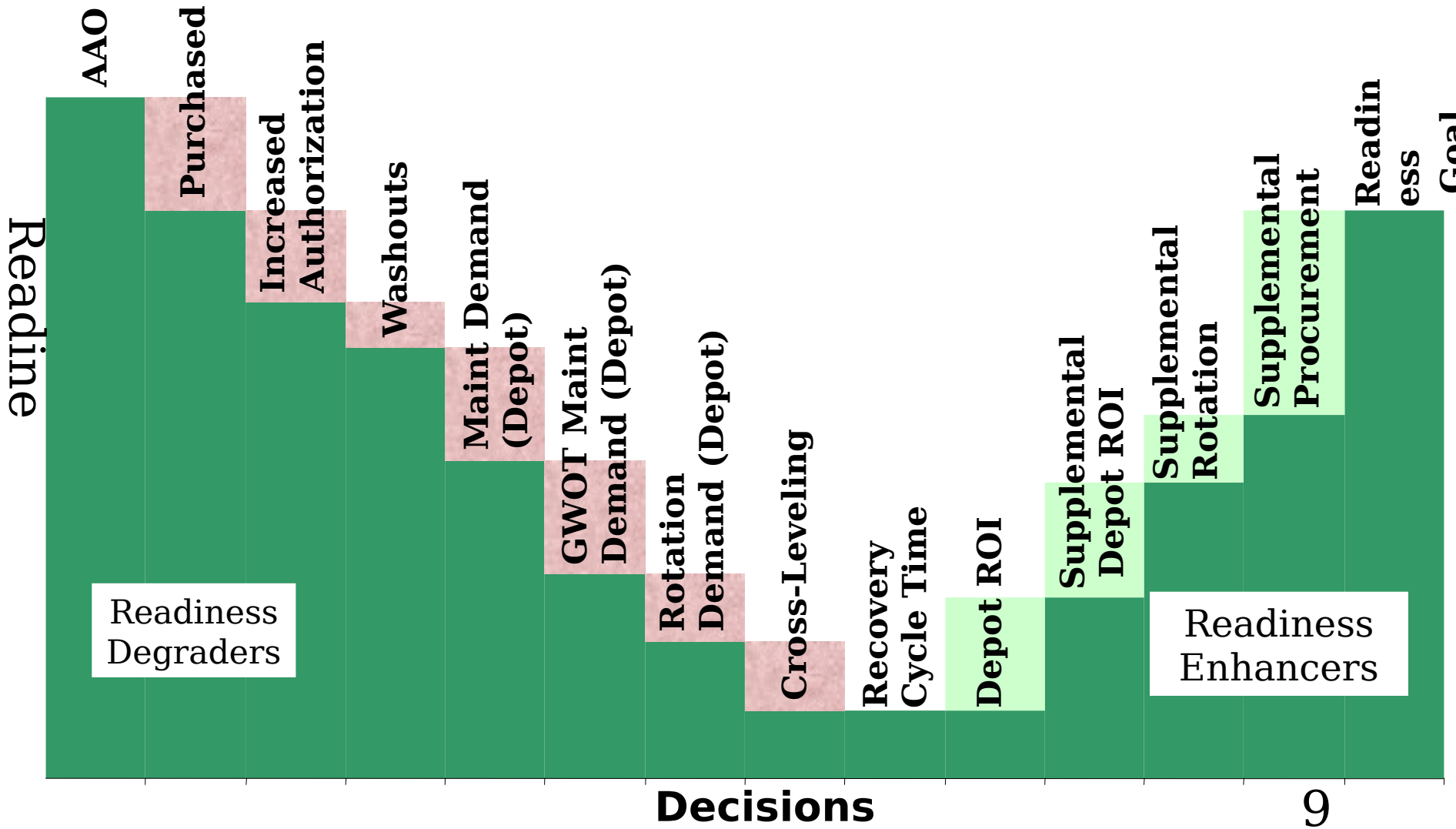


What impacts asset availability?



Requirements Assessment and Distribution Model

- What are the total requirements?
  - Known and emerging (LOGAIS & Excel)
- Do we have enough assets to cover them?
  - LOGAIS & Excel

- Methodology
  - Builds requirements from various sources
  - Uses HQMC directed priorities
  - Redistributes assets to MEF level

- Model Capability
  - Easily Tailorable
  - Current
  - Quick

DEMO

Another Paradigm Example

- **Attrition Has An Impact on Asset Availability**
  - **Can we measure the attrition ?**
  - **What can we expect to lose in the future?**
  - **What is the cost of recovery?**

Attrition Assessment & Forecasting Model

- What are our actual equipment losses?
- What are our forecasted losses?

- Methodology
  - Ties historical data to optempo
  - Requires assumptions about future optempo
  - Uses simulation to forecast losses

- Model Capability
  - Easily Tailorable
  - Current
  - Quick

DEMO

Critical TAMCN Model

- What are our most critical TAMCNs?
- A quad model application

- Methodology
  - Uses both historical trends and current posture
  - State of the art statistical algorithms

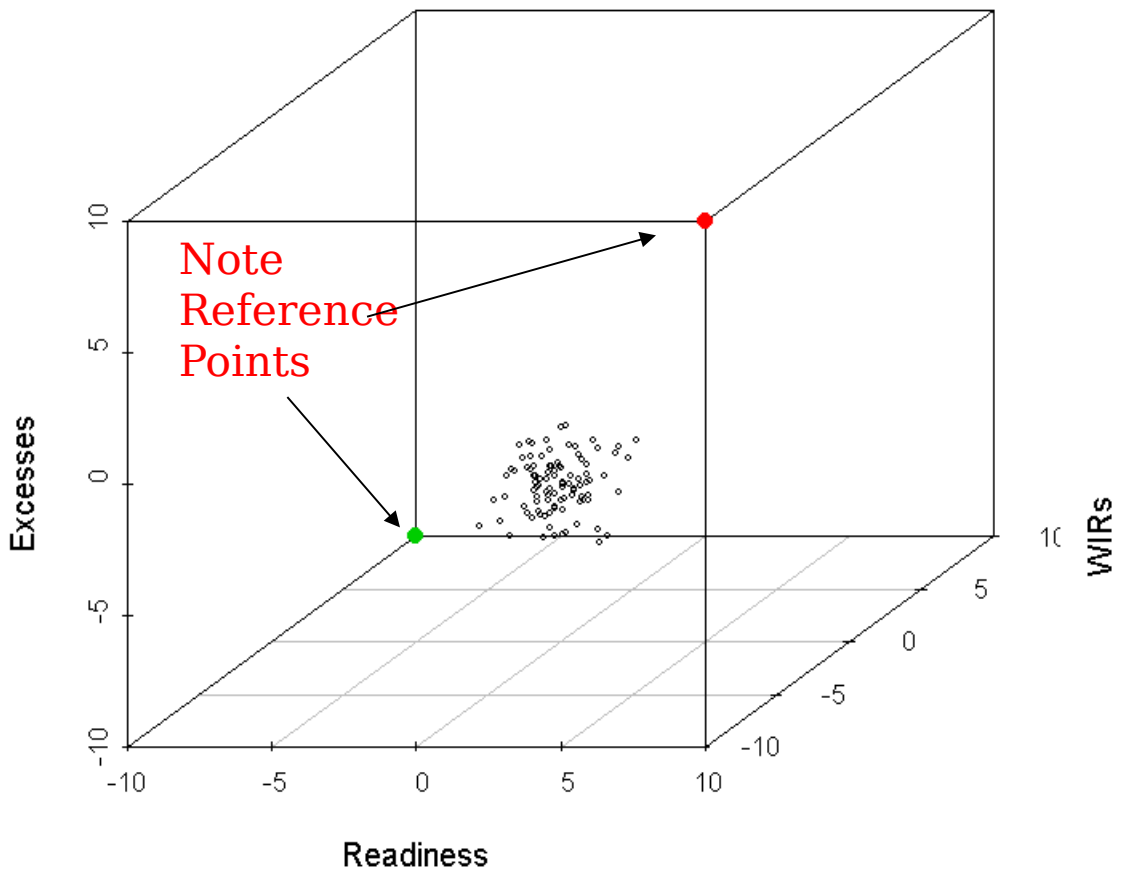
- Model Capability
  - Copes with dynamic environment
  - Current
  - Quick

How Do You Define Critical?

- Most Expensive to Repair?
- Greatest Replacement Cost
- Least Reliable?
- Hardest to Maintain?
- Greatest Attrition Rate?
- Oldest?
- Greatest Increase in Maintenance Effort?
- Greatest Increase in Sustainment Costs?
- …?

Three Dimensional Data

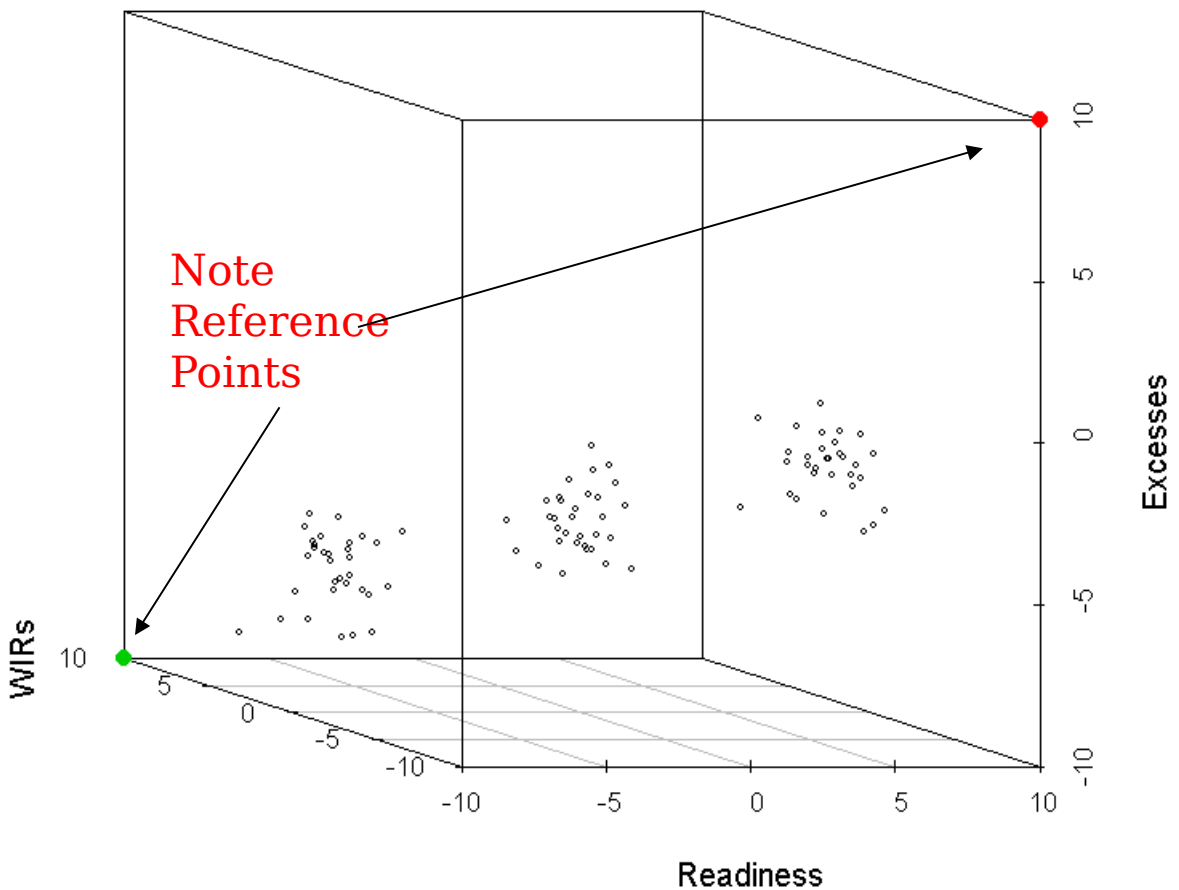
(Difficult To Distinguish Between The Points)



Life Cycle LCMI Modeling Integrator

Same Data... Different Perspective

(Clearly Distinguishable Clusters of PEIs)



A More Realistic Example

One Possible Set Of Essential Character

- Allowance
- Possessed
- Excess
- Deficiency
- Deadlined
- CAT M Echelon 2
- CAT M Echelon 3
- CAT M Echelon 4
- Age this year
- Life Expectancy
- Damaged Repairable
- Damaged Not Repairable
- On "Mission Essential" List
- Affordability Index
  (Support Costs) / [(Replacement Cost)*(MR Rate)]
- Average Equipment Density

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Reduce 15 Dimensions to one

Partnering For Greater Success

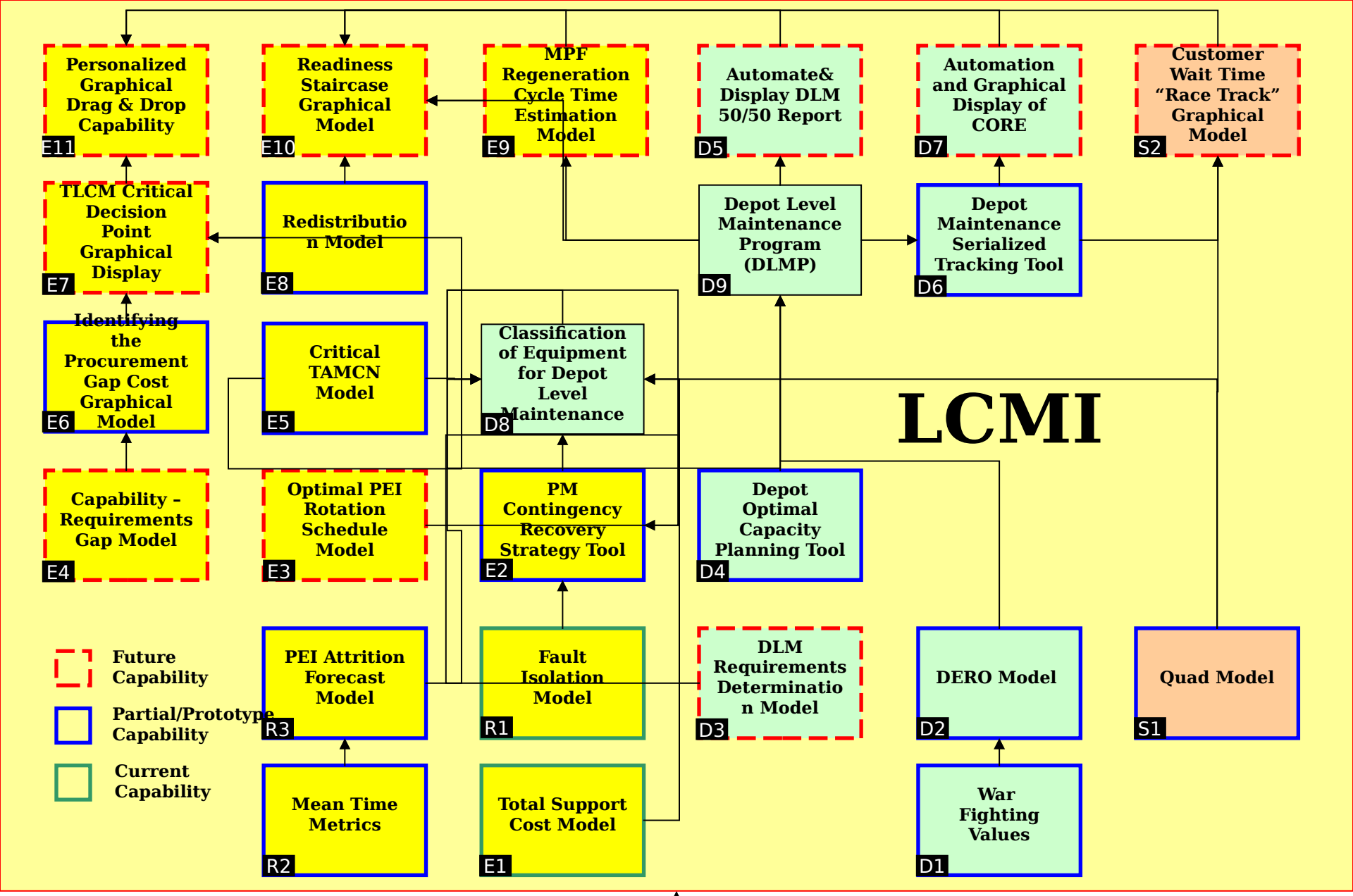
- **Engineering Analysis**
  - *NSWC, Crane*
- **Cost Analysis**
  - *VAMSOC, Navy*
- **Asset Visibility**
  - *BCS3, Army*
  - *GTN 21, Transportation Command*
  - *LOGSA*

- **Reliability, Availability, Maintainability Analysis**
  - *Systems Command*
- **Field process analysis**
  - *Log Modernization Team*
- **Supply chain performance improvement**
  - *DLA*

Life Cycle LCMI Modeling Integrator

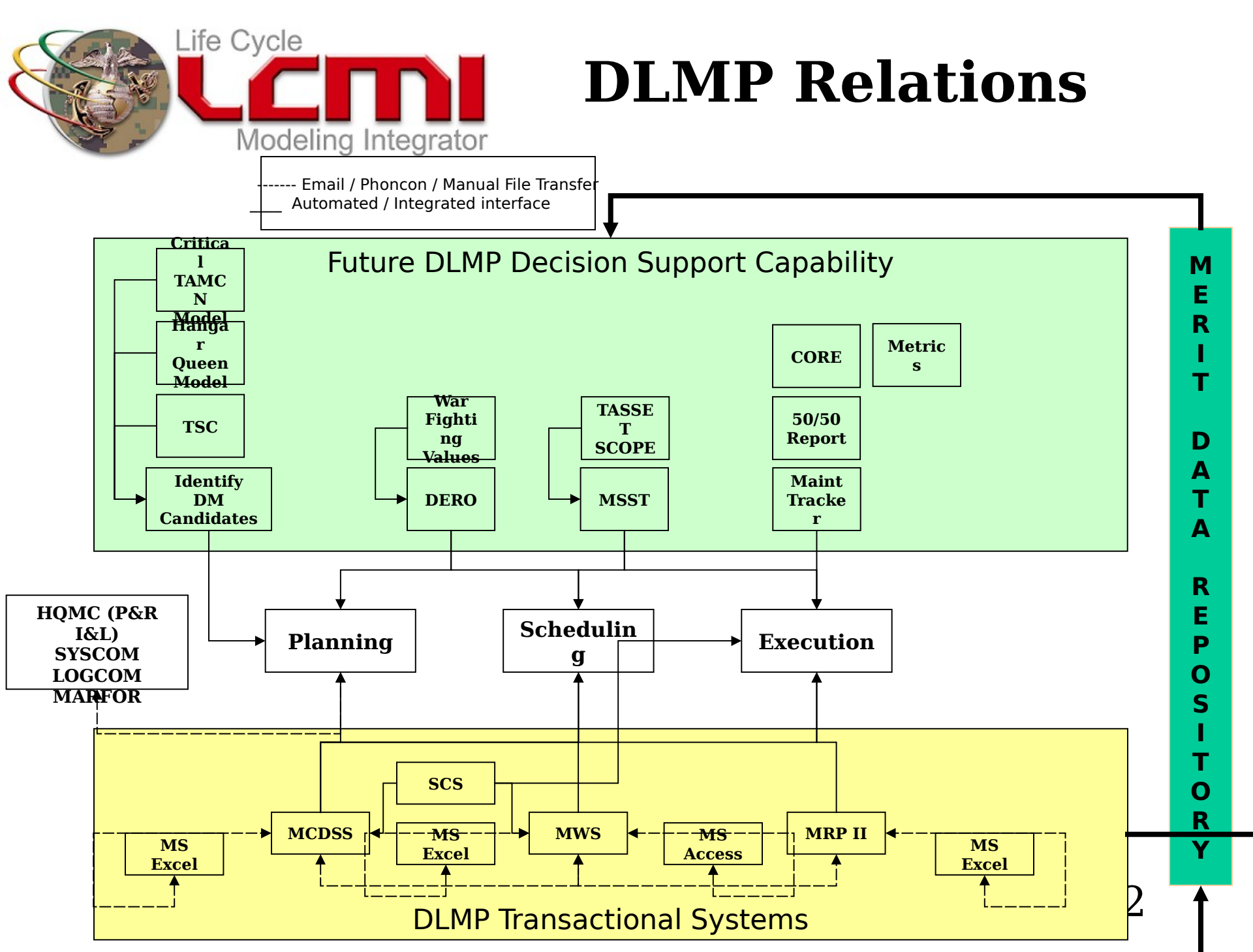
Summary

- Decision Support Tools are powerful and effective enablers
- Integration is a key component for success
- Several DST capabilities completed
- Multiple prototype & partial tools available
- Future needs can be met
- S&A is a Marine Corps asset


Personalized Graphical Drag & Drop Capability
E11
Readiness Staircase Graphical Model
E10
MPF Regeneration Cycle Time Estimation Model
E9
Automate& Display DLM 50/50 Report
D5
Automation and Graphical Display of CORE
D7
Customer Wait Time "Race Track" Graphical Model
S2
TLCM Critical Decision Point Graphical Display
E7
Redistributio n Model
E8
Depot Level Maintenance Program (DLMP)
D9
Depot Maintenance Serialized Tracking Tool
D6
Identifying the Procurement Gap Cost Graphical Model
E6
Critical TAMCN Model
E5
Classification of Equipment for Depot Level Maintenance
D8
LCMI
Capability – Requirements Gap Model
E4
Optimal PEI Rotation Schedule Model
E3
PM Contingency Recovery Strategy Tool
E2
Depot Optimal Capacity Planning Tool
D4
Future Capability
Partial/Prototype Capability
Current Capability
PEI Attrition Forecast Model
R3
Fault Isolation Model
R1
DLM Requirements Determinatio n Model
D3
DERO Model
D2
Quad Model
S1
Mean Time Metrics
R2
Total Support Cost Model
E1
War Fighting Values
D1
MERIT Data Repository (MDR)

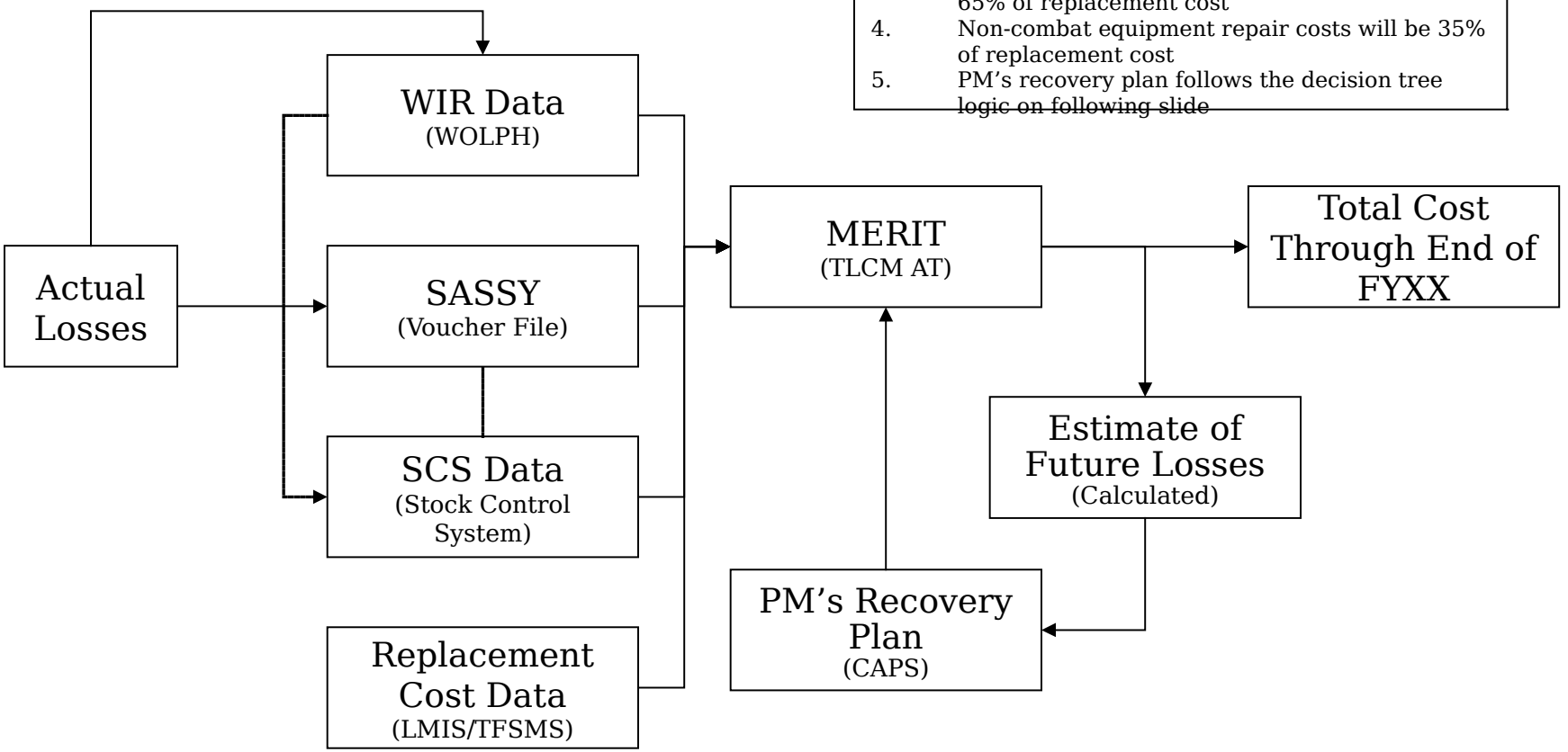
End

DLMP Relations



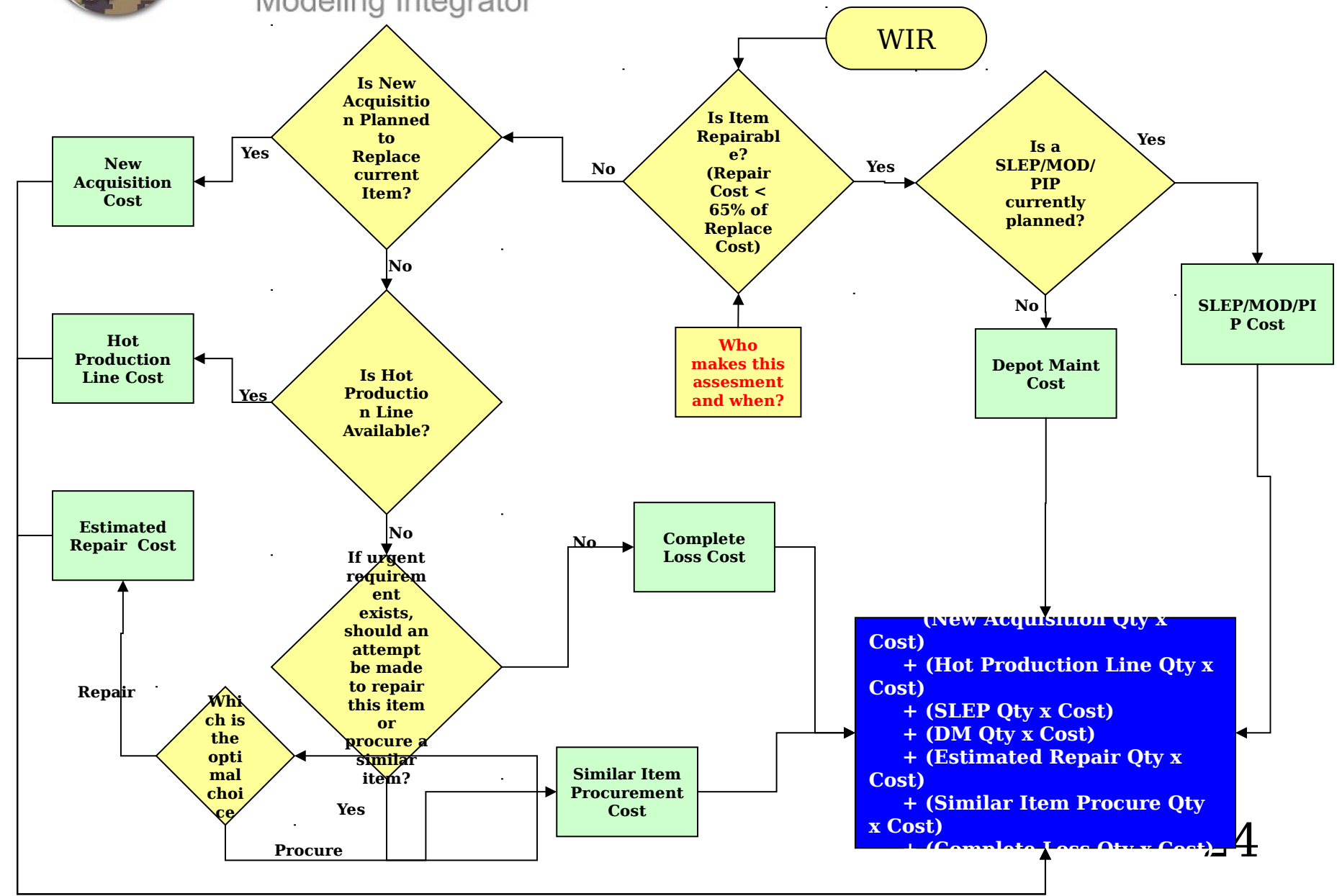
Forecasting the DM Requirement & Equipment Attrition

Assumptions:
1. LMIS IDF contains accurate replacement costs
2. WIR from WOLPH contains accurate NSN and quantity data
3. Combat damaged equipment repair costs will be 65% of replacement cost
4. Non-combat equipment repair costs will be 35% of replacement cost
5. PM's recovery plan follows the decision tree logic on following slide

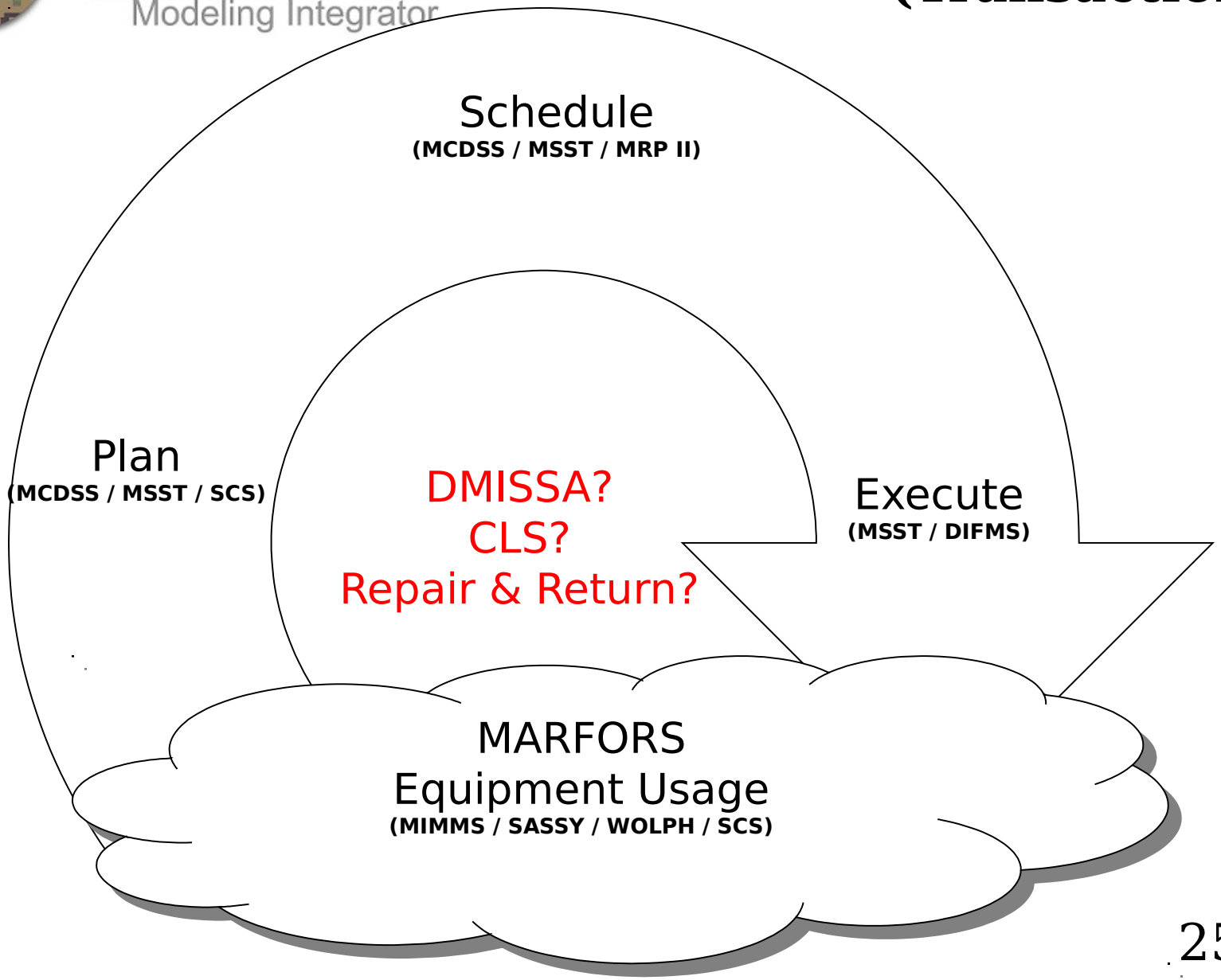


Life Cycle LCMI Modeling Integrator

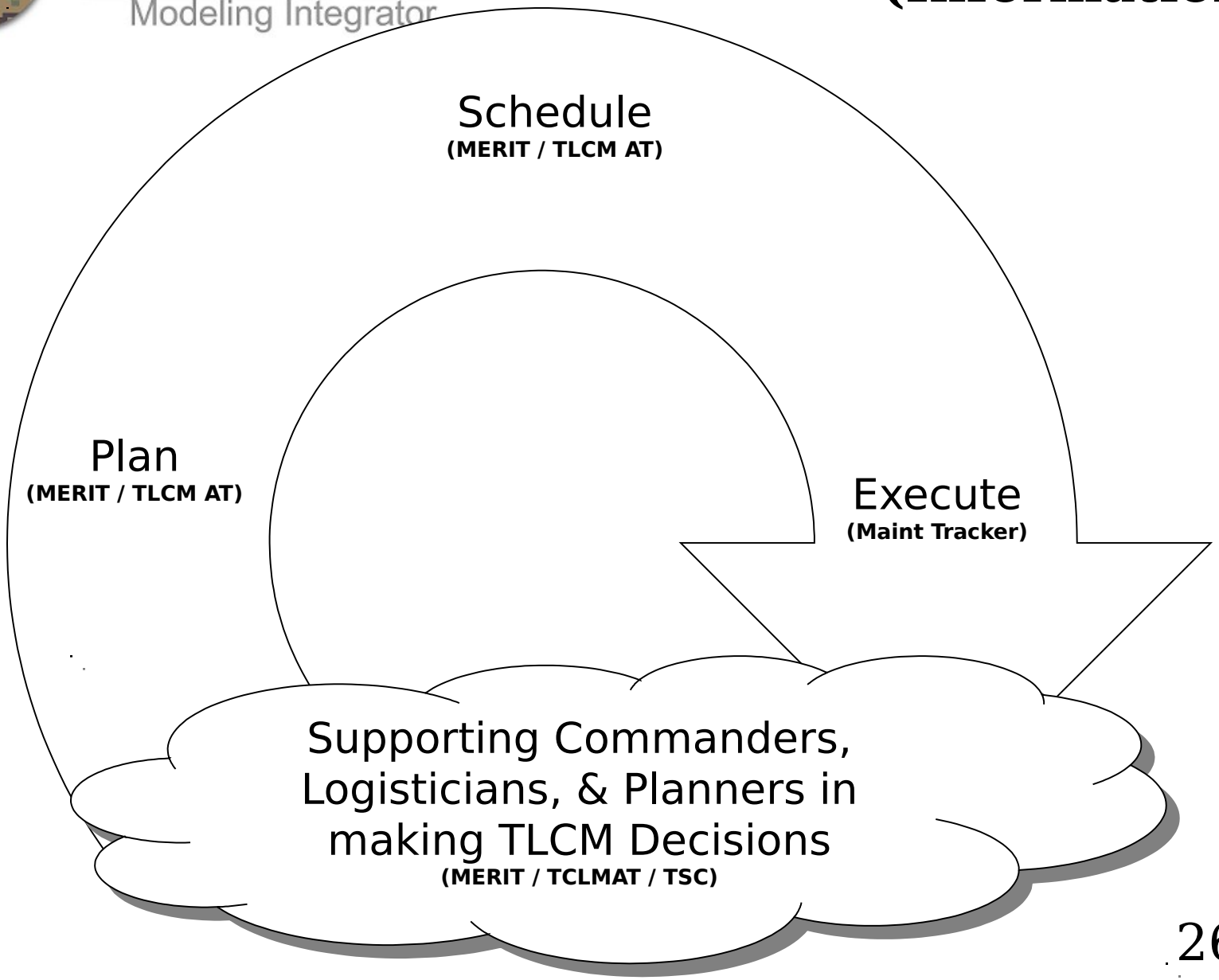
Repair/Replace Decision Tree



DM Segments (Transactional)



DM Segments (Informational)



LCMI

MERIT	MISC	TSC	TLCMAT	SCOPE	RAM ACPROD	Software Hardware	MSST	Serialized Tracking	dB / Feeds

Sustainment

- DLM RSA
- MPF Drill Down
- Non Rpt Enterprise View
- Org TAMCN Summar
- OutYear Development
- SIPR Support
- Help / Manual
- Risk Mgt
- PEI Attrition Forecast Model
- DLM Tracking Tool
- Procure Gap Cost Model (Graphical)
- Readiness Staircase Model
- Graphical Display of CORE
- PEI Rotation Sched Model
- Depot Opt Cap Plan Tool
- Depot 50/50 Report
- Redist Model
- Fault Isolation Model
- Quad Model
- Critical TAMCN WFV Model
- DERO
- Software Licenses
- Hardware
- HIT
- Data Quality
- BCS3
- Data Maps
- Ops Scheduler
- Discoverer

Life Cycle LCMI Modeling Integrator

Evaluating th
Susta
Cros

OSD's Goal: Model This

RFI

DRMO
Ship
BER
Depot Repair
Trouble-shoot
Test
Package/Preserve
Induct at Depot
Ship
Purchase
Ship
Ship
Wholesale Supply
War Reserve
Ship
Wholesale Supply
Ship
Package/Preserve
Trouble-shoot
Retail Supply
Field Repair, I-level
Remove
Test
Field Repair O-level
Trouble-shoot
Retail Supply
Install
Test
Use/Break

Planned Sustainment Cycle Tim
Vs.
Actual Sustainment Cycle Tim

End-to-End Equipment Sustainment Value Chain (Asset Availability)

Planned Materiel Availably
Vs.
Actual Materiel Availability

Non-RFI